

New framework uses patterns to predict terrorist behavior

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Mohammad Khasawneh, professor and head of the Systems Science and Industrial Engineering (SSIE) department at Binghamton University and Binghamton University Ph.D. candidate Salih Tutun. Credit: Salih Tutun

Government agencies are having difficulty tracking potential terrorist attacks, since terrorists have developed new ways to communicate besides social media. A new framework developed by researchers at Binghamton University, State University of New York is able to predict future terrorist attacks by recognizing patterns in past attacks.

Using data on more than 140,000 terrorist attacks between 1970 and 2014, Binghamton University PhD candidate Salih Tutun developed a framework that calculates the [relationship](#) between select features of terrorist attacks (e.g. attack time, weapon type). Mohammad Khasawneh, professor

and head of the Systems Science and Industrial Engineering (SSIE) department at Binghamton University, assisted and advised Tutun with his research. The framework identifies the characteristics of future [terrorist attacks](#) by analyzing the relationship between past attacks. Comparing the results with existing data shows that the proposed method was able to successfully predict most of the characteristics of attacks with more than 90% accuracy. These results support the previous findings that terrorists tend to emulate the behavior of other terrorist groups and learn from their mistakes and successes.

"They are learning, but they don't know they are learning. If we don't have social media or other technologies, we need to understand the patterns. Our framework works to define which metrics are important," said Tutun. "Based on this feature, we propose a new similarity (interaction) function. Then we use the similarity (interaction) function to understand the difference (how they interact with each other) between two attacks. For example, what is the relationship between the Paris and the 9/11 attacks? When we look at that, if there's a relationship, we're making a network. Maybe one attack in the past and another attack have a big relationship, but nobody knows. We tried to extract this information."

Previous studies have focused on understanding the behavior of individual terrorists (as people) rather than studying the different attacks by modeling their relationship with each other. And terrorist activity detection focuses on either individual incidents, which does not take into account the dynamic interactions among them; or network analysis, which gives a general idea about networks but sets aside functional roles of individuals and their interactions.

"Predicting terrorist events is a dream, but protecting some area by using patterns is a reality. If you know the patterns, you can reduce the risks.

It's not about predicting, it's about understanding," said Tutun.

Tutun believes that policymakers can use these approaches for time-sensitive understanding and detection of terrorist activity, which can enable precautions to avoid against future attacks.

"When you solve the problem in Baghdad, you solve the problem in Iraq. When you solve the problem in Iraq, you solve the problem in the Middle East. When you solve the problem in the Middle East, you solve the problem in the world," said Tutun. "Because when we look at Iraq, these patterns are happening in the USA, too."

Tutun presented his work at the 2016 Industrial and Systems Engineering Research Conference (ISERC).

Provided by Binghamton University

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